

In the Claims

Amendments to the Claims:

1. (currently amended) A method of forming a waveguide, comprising the steps of:

providing a structure;

forming an underclad layer over the structure;

forming a core layer over the underclad layer; and

5 patterning:

the core layer to form the waveguide; and

partially into the underclad layer, forming an overetched underclad layer having a projection underneath the waveguide; the waveguide having stress gradients and the overetched underclad layer having stress gradients.

2. (original) The method of claim 1, wherein the structure is comprised of silicon, silicon oxide, glass or GaAs; the underclad layer is comprised of silica or GaAsP; and the core layer is comprised of silica, Ge doped silica, or B, P and Ge doped silica.

3. (original) The method of claim 1, wherein the structure is comprised of silicon; the underclad layer is comprised of silica; and the core layer is comprised of silica.

4. (original) The method of claim 1, wherein the structure is from about 0.20 to 1.50 mm thick; the underclad layer is from about 5.00 to 25.00 μm thick and the core layer is from about 3.00 to 10.00 μm thick.

5. (original) The method of claim 1, wherein the structure is about 1.00 mm thick, the underclad layer is about 15.00 μm thick and the core layer is about 6.00 μm thick.

6. (original) The method of claim 1, wherein the underclad layer has a width and the underclad layer is overetched about one-half its width.

7. (original) The method of claim 1, wherein the underclad layer has a width of about 6.00 μm and is overetched about 3.00 μm .

8. (original) The method of claim 1, wherein the waveguide is from about 0.50 to 6.00 μm wide.

9. (original) The method of claim 1, wherein the waveguide is about 6.00 μm wide.

10. (original) The method of claim 1, including the step of forming an overclad layer over the waveguide and the overetched underclad layer.

11. (original) The method of claim 1, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer being comprised of a material that optically matches the underclad layer.

12. (currently amended) The method of claim 1, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer being comprised of silica, glass or ~~GaAs~~ GaAs[.]

13. (original) The method of claim 1, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer being comprised of silica.

14. (original) The method of claim 1, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer having a thickness of from about 0.50 to 6.00 μm .

15. (original) The method of claim 1, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer having a thickness of from about 2.00 to 4.00 μm .

16. (original) The method of claim 1, wherein the overetching of the underclad layer lowers the stress gradients from the waveguide into the projection of the overetched underclad layer.

17. (original) The method of claim 1, wherein the stress-induced birefringence of the waveguide is reduced.

18. (original) The method of claim 1, wherein the polarization sensitivity of the waveguide is reduced.

19. (original) The method of claim 1, wherein the coefficient of thermal expansion for the substrate and the core layer are different.

20. (currently amended) A method of forming a waveguide, comprising the steps of:

providing a structure;
forming an underclad layer over the structure;

forming a core layer over the underclad layer;

patterning:

the core layer to form the waveguide; and

partially into the underclad layer, forming an overetched underclad layer having a projection underneath the waveguide; the waveguide having stress gradients and the overetched underclad layer having stress gradients; and

forming an overclad layer over the waveguide and the overetched underclad layer.

21. (original) The method of claim 20, wherein the structure is comprised of silicon, silicon oxide, glass or GaAs; the underclad layer is comprised of silica or GaAsP; and the core layer is comprised of silica, Ge doped silica, or B, P and Ge doped silica.

22. (original) The method of claim 20, wherein the structure is comprised of silicon; the underclad layer is comprised of silica; and the core layer is comprised of silica.

23. (original) The method of claim 20, wherein the structure is from about 0.20 to 1.50 mm thick; the underclad layer is from about 5.00 to 25.00 μm thick and the core layer is from about 3.00 to 10.00 μm thick.

24. (original) The method of claim 20, wherein the structure is about 1.00 mm thick, the underclad layer is about 15.00 μm thick and the core layer is about 6.00 μm thick.

25. (original) The method of claim 20, wherein the underclad layer has a width and the underclad layer is overetched about one-half its width.

26. (original) The method of claim 20, wherein the underclad layer has a width of about 6.00 μm and is overetched about 3.00 μm .

27. (original) The method of claim 20, wherein the waveguide is from about 0.50 to 6.00 μm wide.

28. (original) The method of claim 20, wherein the waveguide is about 6.00 μm wide.

29. (original) The method of claim 20, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer being comprised of a material that optically matches the underclad layer.

30. (currently amended) The method of claim 20, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer being comprised of silica, glass or ~~GaAs~~ GaAs[.]

31. (original) The method of claim 20, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer being comprised of silica.

32. (original) The method of claim 20, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer having a thickness of from about 0.50 to 6.00 μm .

33. (original) The method of claim 20, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer having a thickness of from about 2.00 to 4.00 μm .

34. (original) The method of claim 20, wherein the overetching of the underclad layer lowers the stress gradients from the waveguide into the projection of the overetched underclad layer.

35. (original) The method of claim 20, wherein the stress-induced birefringence of the waveguide is reduced.

36. (original) The method of claim 20, wherein the polarization sensitivity of the waveguide is reduced.

37. (original) The method of claim 20, wherein the coefficient of thermal expansion for the substrate and the core layer are different.

38. (currently amended) A method of forming a waveguide, comprising the steps of:

providing a structure;

forming an underclad layer over the structure; the underclad layer having a

5 width;

forming a core layer over the underclad layer; and

patterning:

the core layer to form the waveguide; and

partially into the underclad layer about one-half of its width, forming

10 an overetched underclad layer having a projection underneath the waveguide; the waveguide having stress gradients and the overetched underclad layer having stress gradients.

39. (original) The method of claim 38, wherein the structure is comprised of silicon, silicon oxide, glass or GaAs; the underclad layer is comprised of silica or GaAsP; and the core layer is comprised of silica, Ge doped silica, or B, P and Ge doped silica.

40. (original) The method of claim 38, wherein the structure is comprised of silicon; the underclad layer is comprised of silica; and the core layer is comprised of silica.

41. (original) The method of claim 38, wherein the structure is from about 0.20 to 1.50 mm thick; the underclad layer is from about 5.00 to 25.00 μm thick and the core layer is from about 3.00 to 10.00 μm thick.

42. (original) The method of claim 38, wherein the structure is about 1.00 mm thick, the underclad layer is about 15.00 μm thick and the core layer is about 6.00 μm thick.

43. (original) The method of claim 38, wherein the underclad layer has a width of about 6.00 μm and is overetched about 3.00 μm .

44. (original) The method of claim 38, wherein the waveguide is from about 0.50 to 6.00 μm wide.

45. (original) The method of claim 38, wherein the waveguide is about 6.00 μm wide.

46. (original) The method of claim 38, including the step of forming an overclad layer over the waveguide and the overetched underclad layer.

47. (original) The method of claim 38, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer being comprised of a material that optically matches the underclad layer.

48. (currently amended) The method of claim 38, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer being comprised of silica, glass or GaAs GaAs[.].

49. (original) The method of claim 38, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer being comprised of silica.

50. (original) The method of claim 38, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer having a thickness of from about 0.50 to 6.00 μm .

51. (original) The method of claim 38, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer having a thickness of from about 2.00 to 4.00 μm .

52. (original) The method of claim 38, wherein the overetching of the underclad layer lowers the stress gradients from the waveguide into the projection of the overetched underclad layer.

53. (original) The method of claim 38, wherein the stress-induced birefringence of the waveguide is reduced.

54. (original) The method of claim 38, wherein the polarization sensitivity of the waveguide is reduced.

55. (original) The method of claim 38, wherein the coefficient of thermal expansion for the substrate and the core layer are different.

56. (new) A method of forming a waveguide, comprising the steps of:

providing a structure;

forming an underclad layer over the structure;

forming a core layer over the underclad layer; and

5 patterning:

the core layer to form the waveguide; the waveguide having a width;

and

partially into the underclad layer to about one-half of the width of the waveguide,

to form an overetched underclad layer having a projection underneath the

10 waveguide; the waveguide having stress gradients and the overetched underclad

layer having stress gradients.

57. (new) The method of claim 56, wherein the structure is comprised of silicon,

silicon oxide, glass or GaAs; the underclad layer is comprised of silica or GaAsP;

and the core layer is comprised of silica, Ge doped silica, or B, P and Ge doped

silica.

58. (new) The method of claim 56, wherein the structure is comprised of silicon; the

underclad layer is comprised of silica; and the core layer is comprised of silica.

59. (new) The method of claim 56, wherein the structure is from about 0.20 to 1.50 mm thick; the underclad layer is from about 5.00 to 25.00 μm thick and the core layer is from about 3.00 to 10.00 μm thick.

60. (new) The method of claim 56, wherein the structure is about 1.00 mm thick, the underclad layer is about 15.00 μm thick and the core layer is about 6.00 μm thick.

61. (new) The method of claim 56, wherein the waveguide has a width of about 6.00 μm and the underclad layer is overetched about 3.00 μm .

62. (new) The method of claim 56, wherein the waveguide is from about 0.50 to 6.00 μm wide.

63. (new) The method of claim 56, wherein the waveguide is about 6.00 μm wide.

64. (new) The method of claim 56, including the step of forming an overclad layer over the waveguide and the overetched underclad layer.

65. (new) The method of claim 56, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer being comprised of a material that optically matches the underclad layer.

66. (new) The method of claim 56, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer being comprised of silica, glass or GaAs.

67. (new) The method of claim 56, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer being comprised of silica.

68. (new) The method of claim 56, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer having a thickness of from about 0.50 to 6.00 μm .

69. (new) The method of claim 56, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer having a thickness of from about 2.00 to 4.00 μm .

70. (new) The method of claim 56, wherein the overetching of the underclad layer lowers the stress gradients from the waveguide into the projection of the overetched underclad layer.

71. (new) The method of claim 56, wherein the stress-induced birefringence of the waveguide is reduced.

72. (new) The method of claim 56, wherein the polarization sensitivity of the waveguide is reduced.

73. (new) The method of claim 56, wherein the coefficient of thermal expansion for the substrate and the core layer are different.

74. (new) A waveguide structure, comprising:

a structure;

an overetched underclad layer over the structure; the overetched underclad layer having a projection; and

5 a patterned core layer over the overetched underclad layer projection; the patterned core layer forming the waveguide; the waveguide having a width; ; the waveguide having stress gradients and the overetched underclad layer having stress gradients;

wherein the overetched underclad layer projection projects above the overetched
10 underclad layer to about one-half the width of the waveguide.

75. (new) The waveguide structure of claim 74, wherein the structure is comprised of silicon, silicon oxide, glass or GaAs; the underclad layer is comprised of silica or GaAsP; and the core layer is comprised of silica, Ge doped silica, or B, P and Ge doped silica.

76. (new) The waveguide structure of claim 74, wherein the structure is comprised of silicon; the underclad layer is comprised of silica; and the core layer is comprised of silica.

77. (new) The waveguide structure of claim 74, wherein the structure is from about 0.20 to 1.50 mm thick; the underclad layer is from about 5.00 to 25.00 μm thick and the core layer is from about 3.00 to 10.00 μm thick.

78. (new) The waveguide structure of claim 74, wherein the structure is about 1.00 mm thick, the underclad layer is about 15.00 μm thick and the core layer is about 6.00 μm thick.

79. (new) The waveguide structure of claim 74, wherein the waveguide has a width of about 6.00 μm and the underclad layer is overetched about 3.00 μm .

80. (new) The waveguide structure of claim 74, wherein the waveguide is from about 0.50 to 6.00 μm wide.

81. (new) The waveguide structure of claim 74, wherein the waveguide is about 6.00 μm wide.

82. (new) The waveguide structure of claim 74, including the step of forming an overclad layer over the waveguide and the overetched underclad layer.

83. (new) The waveguide structure of claim 74, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer being comprised of a material that optically matches the underclad layer.

84. (new) The waveguide structure of claim 74, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer being comprised of silica, glass or GaAs.

85. (new) The waveguide structure of claim 74, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer being comprised of silica.

86. (new) The waveguide structure of claim 74, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer having a thickness of from about 0.50 to 6.00 μm .

87. (new) The waveguide structure of claim 74, including the step of forming an overclad layer over the waveguide and the overetched underclad layer; the overclad layer having a thickness of from about 2.00 to 4.00 μm .

88. (new) The waveguide structure of claim 74, wherein the overetching of the underclad layer lowers the stress gradients from the waveguide into the projection of the overetched underclad layer.

89. (new) The waveguide structure of claim 74, wherein the stress-induced birefringence of the waveguide is reduced.

90. (new) The waveguide structure of claim 74, wherein the polarization sensitivity of the waveguide is reduced.

91. (new) The waveguide structure of claim 74, wherein the coefficient of thermal expansion for the substrate and the core layer are different.